

WOOD STORK (*Mycteria americana*)

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Criteria Scores

Population Trend	Range Trend	Population Size	Range Size	Endemism	Population Concentration	Threats
10	10	10	10	0	10	10

Special Concern Priority

Currently considered a Bird Species of Special Concern (post-breeding visitor), Priority 1. Listed on CDFG's (1992) unprioritized list but not on the original prioritized list (Remsen 1978).

Breeding Bird Survey Statistics for California

Data inadequate for trend assessment (Sauer et al. 2000).

General Range and Abundance

Subtropical and tropical wading bird (often called "Wood Ibis" in older literature) with wide distribution from Mexico and the extreme southeastern United States south through much of lowland South America (generally east of the Andes). Middle American range mapped in Howell and Webb (1995) and South American range mapped in Blake (1977). No subspecies recognized. Within U. S. breeding generally limited to Florida (including very locally in Panhandle), Georgia (mainly coastal plain, but locally in southwest), and southernmost coastal plain of South Carolina; formerly bred in Texas, Alabama and Louisiana (Coulter et al. 1999). Isolated nesting attempts recorded in California (see below).

In western Mexico nests north to Sinaloa, but numbers have declined in northern part of range; in Sonora now considered rare (Russell and Monson 1998), but formerly a common summer visitor in coastal and interior wetlands north at least to Guaymas (van Rossem 1945). Recent Sonoran records span 17 May to 1 October and generally involve only single birds. Fairly common to common resident and local breeder in remainder of Mexican range from Sinaloa and Tamaulipas

southward (Howell and Webb 1995). Common permanent resident in saline and brackish habitats on Pacific coastal plain of Oaxaca, but only one colony (136 adults) specifically cited by Binford (1989); also common resident in Colima (Schaldach 1963). Knoder et al. (1980) recorded breeding colonies of up to 500 nests in several coastal localities from Guerrero to Chiapas. Largest breeding colonies in Mexico are in the southern Gulf of Mexico coast from e. Veracruz to central Campeche, with some 15,000 breeding pairs estimated by Sprunt (1980).

Only nesting record for western North America north of Mexico is of single pairs attempting to nest in San Diego Co., California, in 1987, 1989 and 1991 (see below). Has possibly nested in Baja California; an egg set of this species was taken at “Point Telmo”, presumed to be on the Baja California peninsula (Wilbur 1987).

Irregular northward post-breeding dispersal to sw. United States, Gulf Coast, and s. Atlantic states; small flocks or individuals occasionally occur as vagrants far to north of these regions, with great interannual fluctuations in numbers (Lowery 1974, Coulter et al. 1999).

Seasonal Status in California

Apart from extralimital nesting in San Diego County, currently a post-breeding visitor to California, occurring almost exclusively from late May to early September (Garrett and Dunn 1981). Extreme dates for Imperial Valley cited by Garrett and Dunn (1981) and Patten et al. (*in press*) are 10 April (1980), 2 May (1986) and 3 May (1980) to 29 Oct (1953) and 29-30 Nov 1919 (11 birds); single winter record 18 February to 12 March [**Patten et al. say 23 Apr**] 1978 (AB 32:398, 32:1054). In recent years, smaller post-breeding populations have generally not remained later than mid-September (Patten et al. *in press*). In San Diego County formerly occurred irregularly in large numbers July through September, with some occurring as early as late May and a few lingering to December and January (Unitt 1984). Single records in March-April, December, and January in San Diego County (Unitt 1984); there are a few other unseasonal coastal records farther north.

Historical Range and Abundance in California

At the Salton Sea Wood Storks have historically occurred almost exclusively as post-breeding visitors; numbers varied from year to year but the species was often “fairly common to abundant” (Patten et al. *in press*). Few quantitative data exist prior to the 1960s; after that counts as high as 2000 (18 July 1974; Patten et al. *in press*) and 1000 (18 September 1964; Garrett and Dunn 1981) have been recorded. The great majority of birds at the Salton Sea have been concentrated at the south end in Imperial Co. (Garrett and Dunn 1981), with only about ten records (generally of single birds) at the north end of the Salton Sea in Riverside Co. (Patten et al. *in press*).

Along the lower Colorado River formerly “common to abundant” from writings of early workers (cited in Rosenberg et al 1991), and perhaps occasionally remaining through the winter and spring (e. g. flocks reported in January through April) The largest flock recorded was 230 birds on 16 July 1959 near Laguna Dam, Imperial Co. (Rosenberg et al. 1991). Storks ranged north rarely to the Bill Williams River delta on the Arizona side of the river.

In coastal California the status of Wood Storks parallels that at the Salton Sea, with numbers generally lower in the former region, but still substantial. However, coastal occurrences were always erratic, and numbers and years of occurrence dropped steeply after about 1960 and have today declined to near zero. Formerly “irregularly common” in coastal lagoons of San Diego County from July to September (Unitt 1984), with maxima including “hundreds” in the Sweetwater River Valley near Dehesa 30 August 1923, 500 at Agua Hedionda Lagoon 1-14 August 1938, and 300 at Buena Vista Lagoon July-August 1953. Unitt (1984) emphasizes the great interannual fluctuations in numbers in San Diego County. Probably regular in coastal Orange County through the mid-1900s (Hamilton and Willick 1996), but few specific records. Flocks of 25 or more birds were found in coastal Los Angeles County in the early 1900s (Willett 1912). Decidedly uncommon and irregular farther north, with numerous records for Ventura, Santa Barbara, and San Luis Obispo

Counties (Lehman 1994, Marantz 1986), and one record for Monterey County (10-31 July 1976 in Big Sur; Roberson 1985).

Wood Storks were not restricted to the immediate coast. Grinnell (1898) cites an observation of “a large flock on the barley fields” near Claremont, Los Angeles County, in June 1897, and Willett (1912) cites records along the Santa Ana River in Riverside (undated) and near San Bernardino in the summers of 1891 and 1902. Illustrating the propensity of this species to wander, records extend north to Alameda County on the coast and in the interior to Inyo, Fresno, Merced, Siskiyou and Modoc Counties (Grinnell and Miller 1944, McCaskie et al. 1979).

Recent Range and Abundance in California

Salton Sea numbers have declined precipitously in recent decades. Occurrences there are currently limited to the southern and southeastern shores of the sea, particularly along the lowermost portions and delta of the Alamo River and adjacent shoreline north to the Wister Unit of the Imperial State Waterfowl Management Area. Patten et al. (in press) cite a flock of 2000 at the south end of the Salton Sea on 18 July 1974, and Garrett and Dunn (1981) note high counts there of 650 birds in late July 1977 and 1000 birds on 18 September 1964; these are the last years in which such large concentrations occurred. Peak numbers reaching the Salton Sea in more recent years as indicated in *American Birds/Field Notes/North American Birds* or as cited are:

<u>YEAR</u>	<u>PEAK NUMBER</u>
2001	60 (Guy McCaskie, pers. comm.)
2000	~50 (Guy McCaskie, pers. comm.)
1999	15+
1998	45
1994	~100
1993	21
1992	23
1991	70
1990	75
1989	20
1987	200
1983	300 (Patten et al. <i>in press</i>)
1980	250 (Patten et al. <i>in press</i>)

Since 1974, all lower Colorado River records have been between 9 June and 30 September (Rosenberg et al. 1991), thus showing a pattern similar to that of the Salton Sea. Maximum concentrations in the 1980s along lower Colorado River (Cibola National Wildlife Refuge, just across the border in Arizona), were of 10-50 birds.

Virtually absent from coastal California in recent years. In San Diego County, where formerly most numerous, occurrences declined greatly in the 1950s, with the last substantial flocks being noted in 1961 (Unitt 1984). A single pair attempted to nest near Imperial Beach, San Diego Co., California, in spring 1987 [AB 41(3):487, 1987] and what may have been the same pair nested in a heronry within the San Diego Wild Animal Park in San Pasqual, San Diego Co., in 1989 and 1991 [AB 43(5):1367, 1989; AB 45(5):1160, 1991]; in all these attempts eggs were laid but did not hatch. One individual remained in the colony at the Wild Animal Park as of 2001 (P. Unitt, pers. comm.). Unrecorded in Orange County since up to 5 were found on 8-9 September 1971 (Hamilton and Willick 1996), and there have been no records in Los Angeles County since February 1982 (Long 1993). The most recent record for Santa Barbara County, where apparently always rare, was 5 June to 1 August 1983 at Sandyland Slough in Carpinteria (Lehman 1994). Vagrants have been noted on the coastal slope north to San Luis Obispo Co. during the 1980s and 1990s, with a total of no more than five individuals involved. Most recent records farther north are for Monterey County in 1976 (Roberson 1985), and San Luis Refuge, Merced Co. 27 July-1 Aug 1985 and 1-6 July 1982 near Weed, Siskiyou County (McCaskie et al. 1988).

Ecological Requirements

At the Salton Sea, the center of the species' abundance in California, Wood Storks forage in shallow bays, marshy backwaters, canals and drains, being most numerous around the mouths of the New and Alamo rivers (Garrett and Dunn 1981), and especially the latter river in recent years (Patten et al. *in press*). Resting and roosting birds utilize partly submerged trees and shrubs in backwater areas, or large snags near the water's edge. They have been found on occasion in

flooded fields with Ring-billed Gulls (*Larus delawarensis*), Cattle Egrets (*Bubulcus ibis*) and White-faced Ibis (*Plegadis chihi*), e.g. 35 between El Centro and Calexico 2 October 1946 (Hill and Wiggins 1948), but not in recent years. “Irrigated fields, canal banks, and marshy backwaters” are occupied along the lower Colorado River (Rosenberg et al. 1991). The former abundance of this species along lower Colorado River was attributed by Rosenberg et al. (1991) to the availability of fish stranded each year by receding floodwaters; with damming, channelization, and water flow management, such flooding no longer occurs. Along the coast found mainly in coastal estuaries and also ponds and lakes inland from the ocean (Rechnitzer 1956).

This species is largely a tactile forager, catching aquatic prey with a bill-snapping reflex (Coulter et al 1999). It feeds primarily on fish but also on aquatic snails, crustaceans, amphibians, and occasionally even birds, mammals, and plant material. Diet not well studied in California. Rechnitzer (1956) provides some prey data from coastal southern California and the south end of the Salton Sea, with diet including several fish species, aquatic insects, tadpoles, and vegetable material (including seeds of mesquite, *Prosopis* spp.). Known to take dead fish at fish kills (Coulter et al. 1999). Consumes about 520 g (live weight) of food per day (Coulter et al. 1999). Average lengths of fish prey taken in two Florida sites were 41 mm and 54 mm (Coulter et al. 1999). Post-breeding birds engage in nocturnal foraging in se. United States, even in non-tidal habitats (Bryan et al. 2001); extent of night feeding in California unknown. Roosts and loafs in trees, generally over or near water; may also loaf or roost on levees and along the edges of canals.

Breeding habitat in Mexico mainly consists of tall trees (often mangroves) around or within freshwater, brackish and salt marshes (Howell and Webb 1995); nests colonially, often with other ciconiiform species (Coulter et al. 1999). The isolated nesting attempts in California have been within ardeid colonies.

Proximal causes of timing and extent of post-breeding northward dispersal are uncertain, but are likely to be related to breeding success and to changes in water levels and food availability

(Coulter et al. 1999). Given the vastly larger breeding colonies in se. Mexico (Veracruz, Tabasco, Campeche) relative to those of the Pacific Coast, plus regular sightings of flocks in the Mexican interior (Knoder et al. 1980, Howell and Webb 1995), it is plausible that many California birds may actually come from colonies in the s. Gulf of Mexico. Northward post-breeding dispersal involves all age groups, but is skewed toward immature birds (Coulter et al. 1999)

Threats

Threats are best considered by separating factors operating outside of California from those within the state. It appears almost certain that most of the decline of this species in California is due to extrinsic factors operating within the species' range in Mexico (and possible even farther south).

Declines in portions of se. United States range are mainly attributable to loss of area or quality of wetland foraging habitats through draining of marshes and swamps and unnatural water management practices (Coulter et al. 1999). Southeastern United States populations were listed by U.S.F.W.S. as Endangered in 1984. Contaminants (organochlorines, PCBs, mercury) found in eggs and adults in se. United States, but little evidence of impacts on populations (Coulter et al. 1999); however, mercury concentrations were recently found to be of concern in post-fledging juveniles in Georgia (Bryan et al. 2001). Human disturbance has resulted in abandonment or reproductive failure at nesting colonies (Coulter et al. 1999). There are few data on threats and recent trends in Mexican breeding colonies, but it is likely that many of the factors cited above (disturbance to marshes, loss of trees required for nesting, contaminants and human disturbance) are also operative there.

Within California, the loss or modification of coastal wetlands and wetlands along the lower Colorado River has certainly resulted in a reduction of suitable habitat; as noted above, modification of natural flooding regimes along the lower Colorado River has reduced foraging opportunities for this and other wading species. Considerable foraging habitat remains at the Salton Sea, though loss of habitat quality may also be a factor there. For example, recent efforts to stabilize the shoreline of

the Sea through construction of seawalls has reduced shallow water foraging habitat. Also, tall snags which formed a favorite roosting site near the mouth of the Alamo River (Imperial County) for many years have recently been burned or cut. Most importantly, projected reductions in fresh water and agricultural wastewater flows into the Salton Sea threaten to severely reduce freshwater and brackish river and delta habitats important to foraging storks. Finally, contaminants, including but not limited to organochlorine residues and selenium, are documented in Salton Sea nearshore substrates (Setmire et al. 1993) and could potentially impact Wood Storks.

Management and Research Recommendations

- form partnerships with Mexican wildlife agencies and biologists to gain fuller understanding of threats to breeding habitat, population dynamics, and post-breeding dispersal in Mexico
- maintain appropriate freshwater input at the south end of the Salton Sea to insure continued existence of brackish delta habitats; as appropriate, follow additional recommendations for habitat quality of the Salton Sea as outlined in Shuford et al. 2000).
- retain snags utilized for roosting and loafing in delta areas of south and southeast shores of Salton Sea; plant or encourage growth of cottonwoods and other tall trees native to the Imperial Valley region near the mouths of Alamo and New Rivers to encourage growth of roosting substrate.
- protect and restore coastal estuaries in southern California, important former (and potentially future) habitat for this species within California
- monitor movements of California birds back to Neotropical breeding colonies through satellite tracking

Monitoring Needs

Since declines in California undoubtedly result from reduced populations and diminished breeding success in source areas (presumed to be colonies along the Pacific Coast of western Mexico, but

perhaps also on the southern Gulf of Mexico coast or even south of Mexico altogether), recovery in California is clearly linked to monitoring and protection of Mexican breeding colonies. Wood Storks are adequately monitored in California at present because virtually all sightings away from the Salton Sea are reported in *North American Birds*, and Salton Sea post-breeding populations are readily censused. An effort should be made to determine age ratios of Wood Storks appearing in California each year.

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